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(54) Title: POINTING DEVICE FOR A COMPUTER AND COMPUTER COOPERATING WITH A POINTING DEVICE

(57) Abstract

The mouse or stylus typically used in a personal computer utilising a graphical user interface has hitherto been used solely as a position indicating device and to send basic control signals. This invention discloses providing the mouse or stylus with an internal data store, together with a data communications facility, enabling a variety of new features to be provided, including a software copy protection procedure and automatic access to a predefined security level.

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Pointing device for a Computer and Computer cooperating with a Pointing Device

Field of the Invention

This invention relates to a pointing device for a computer and to a computer cooperating with a pointing device. In particular, in each aspect the pointing device is one that is used both as a pointing device for the computer, for instance to provide graphics input to the computer or control the position of the cursor as well as provide further functions such as inhibiting software piracy and/or preventing unauthorised access to the computer. This invention also relates to a method of inhibiting software piracy.

Description of the Prior Art

Computers that solely have keyboards for data entry are incompatible with software that uses a graphical user interface (GUI). It is necessary to provide some sort of pointing device to take advantage of GUIs and a variety of such pointing devices have been developed. For instance, one can commonly use a mouse, trackball or stylus with a digitising tablet. The stylus is a particularly convenient tool since it can be used not only as a pointing device but also as a writing device too if used in conjunction with a digitising tablet.

It is also well known to provide computers with no keyboard at all, relying instead on all control inputs being made by touching a stylus to a digitiser, commonly overlying or underlying the display (PUI: pen user interface). Such computers allow the input of graphical data, such as handwriting, which may, for example, be stored as a bit mapped image.

There are a variety of problems associated with the prior art approaches to the design of computers. Most significant is the possibility of unauthorised copying or use of software. The commonest solution to this problem is to make software copy protected - i.e the purchaser is able only to use the original discs that s/he has bought. This is often

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extremely inconvenient to the user who has a computer with integral mass storage on which software would otherwise be copied onto for fast and convenient subsequent
5 access. It also means that a disc drive of the machine is occupied.

Another solution is to provide a hardware protection device that is, typically, connected to the parallel port of the computer. Such a device typically contains a unique serial number that is known to a given piece of application software. The system works by
10 enabling the computer to query the protection device and compare the response with the serial number known to the software. Only when there is a match is the software useable. A typical device is the Sentinel (TM) from Rainbow Technologies of Irvine, California. This approach has, however, several drawbacks. The protection devices themselves are relatively expensive to manufacture. They are also unpopular with users
15 since, as each copy protected program has an associated device, any user with several such programs has to either connect the protection devices in parallel, which is ungainly and somewhat physically vulnerable or permanently install them within the casing of the computer, which is inconvenient. As a further alternative, the user could connect the appropriate device up whenever it is needed, but this is again inconvenient. Further,
20 purchasers of software are often reluctant to be forced to acquire any sort of peripheral that affords no advantage to themselves. The perceived inconvenience to the potential purchaser of this approach to copy protection can mean that non-copy protected software is purchased in preference. Consequently, this form of copy protection device has met with only limited commercial success, and even then only in high cost
25 applications such as computer aided design.

Another problem is the difficulty in providing adequate security for stored data, for example protection from unauthorised access. It is known to solve this problem by providing a software access protocol to be satisfied when logging on to the system.
30 Generally,this requires certain code words to be keyed in by the user; this approach has the disadvantage of requiring the user to memorise the code word. Additionally, it is known to provide for each user to have a smart card that can be read by a peripheral smart card reader which can sanction use of the machine at a predetermined access level.
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A further problem is to provide for valuable data to be protected from damage from hazards such as fire etc. The mass storage medium of the computer has been arranged to be physically removable to a safe place to meet this need.

A further problem is in providing for the transfer of data between computers that are not
linked by a data communications channel. Commonly, this can be met by downloading
the data onto a floppy disc in the source machine and then physically taking the disc and
loading it into the recipient machine. It will be appreciated that problems of adequate
physical security and ease of physical transportability can overlap to some extent.

10   Aims of the Invention

The objects of the present invention are to provide a pointing device for a computer and
a computer cooperating with a pointing device that allows the above problems to be
solved.
15   •

Statement of the invention

In accordance with a first aspect of the present invention, a pointing device for a
20   computer comprises electronic memory means for storing stored data; and data
transmission means for transmitting data or control signals between the memory means
and the computer.

By giving the pointing device a data storage and communications capability, many of
25   the above problems may be solved or rendered less serious.

For instance, the stored data can include an access code that allows the user to enter the
computer system to a predetermined level of confidentiality and the transmission means
may then be operable to transmit the access code to the computer; and the computer may
30   comprise electronic recognition means for recognising the access code and allowing
access appropriate to the access code recognised. This may be useful for a pointing
devices, e.g a pen-like stylus for a pen computer, that is not permanently connected to a
computer: the user can simply take the stylus with him when s/he moves away from the
computer, thereby disabling the computer. This approach may be preferable to using a
35   smart card since it removes the need for a smart card reader, thus reducing the cost of
the system. Users may also find it more convenient since it means they do not have to
carry an IC card with them. This security verification process is conveniently entirely
automatic so that it passes unnoticed to the authorised user, further contributing to the

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desirability of the approach of this aspect of the invention in comparison to prior art
systems which rely on physical or electronic keys that have no other purpose except to
5   allow access. One drawback to such a system is that if the user inadvertently forgets to
take the pointing device with him when s/he leaves the computer, then anyone can
access his system. Conveniently, the present invention addresses this by providing that
the data stored in the memory means comprises information that can be displayed on a
display of the computer, the displayed information comprising a menu of false and true
10   statements, whereby the user must select the true statement or statements displayed in
order to access further data. For example, the user could program the pointing device
with questions and related biographic data so that the computer would display a
question e.g. "what was the name of your first pet?" and provide a menu of possible
answers. The user would have to select the correct answer using the pointing device in
15   order to gain further access to the system. Generally, there would be several such
question and answers programmed into the pointing device so that the user would have
to answer several correctly before access would be granted. The order in which the user
would be asked questions would preferably be arranged to vary.

20   The computer may also be operable to download data to the pointing device. This may
be useful if the user wants to keep a record of this data in a safe place. It will be
appreciated that storing a pointing device in a place secure from thieves or hazards such
as fire will be easier than removing and storing a bulk storage medium such as a
removable hard disk assembly. This approach may be particularly convenient when the
25   pointing device is a stylus.

Additionally, the user may want to transfer data from one computer to another but either
cannot physically connect them via a data line or chooses not to for security reasons.
With the present invention, the user need simply download the data to the pointing
30   device from the source computer and then take the pointing device to the recipient
machine and input the data. This approach to transferring data will be particularly
attractive where either of the source or recipient computers have no floppy disc drives,
as is the case with the current generation of keyboardless computers. Again, this
approach may be particularly convenient when the pointing device is a stylus.
35
Further, the computer may then be operable to erase downloaded data from its own
memory store, thereby rendering the data stored on the pointing device the sole store

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for that data. This may be useful in high security areas where the ease of concealment and safe keeping of the pointing device would be advantageous.

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A further advantage in providing a memory in the pointing device is that if the pointing device does get lost, then if the personal details [i.e. name and address etc] of the user are stored in it, the pointing device may be easily returnable. By providing some information in non-erasable form, for instance the name of the owner, it will always

10   subsequently be possible to identify the owner. Similarly, information that has to remain specific to the user and non-corruptable for security reasons can also be recorded in non-erasable form.

If the pointing device has recorded in it a label such as a code or other data unique to

15   that particular pointing device, then the computer may be arranged to write an identifier corresponding to that label, or data derived from that label, onto any software loaded onto the computer that is capable of being written to and does not already comprise any data recognisable to the computer as an identifier. This will generally occur when original [non-pirated] software is loaded onto the computer for the first time. The

20   computer may then be further adapted to check whether any identifier on the software program and the label (if any) of the pointing device correspond to one another and only allow the software to be accessed or run at a full level of functionality if the label and identifier do correspond correctly. Thus, because software can be given a pointing device specific identifier and will not then function in a computer with a different

25   pointing device, the current common practice of software piracy, i.e. making and using unlicensed copies of software, will be eliminated. It will be appreciated that all software using GUI or PUI is protectable in this way.

In one embodiment, if no correct label match is found, then the software can still be run

30   but only at a reduced level of functionality. For example, the user may be able to see the operation of the major program features but be unable to execute certain essential steps such as saving his input or printing it. In this way, the user can be given a disk that shows what the program can do but is of no practical use, i.e. a demonstration disk. Only when the user acquires a pointing device with a recognisable label will the disk

35   become of practical use. Presently, demonstration disks are often of very limited functionality and would be disposed of if the program were purchased, which is clearly wasteful.

Conveniently, this process of user verification may also be arranged to take place at intervals, predetermined or random, during the actual use of the program. This avoids

5   the problem of an authorised user starting the software with his own correctly labelled pointing device but then allowing an unauthorised user to continue by using an incorrectly labelled pointing device.

This process of labelling software with a label identical or derivable from a label

10   installed in the pointing device is a process readily automated and one that can be made relatively inconspicuous to the user, who is therefore not inconvenienced by the process.

Preferably, the pointing device is a mouse or a stylus. This is a particularly convenient

15   embodiment since the copy protection character of the device is masked by the utility to the user of the device. Consequently, it does not suffer from the perceived inconvenience that has made peripheral copy protection devices unattractive to purchasers and, therefore, software vendors. Additionally, by integrating the copy protection components into a device that has to connect to the computer anyway, there

20   are very significant cost savings since no new data connectors or casings have to be provided, unlike prior art systems. Additionally, the user is faced with no extra devices to incorporate or plug into the computer, again unlike prior art approaches.

For the avoidance of doubt, however, the term 'pointing device' includes within its

25   scope any device that allows the user to input screen co-ordinate related information.

In accordance with a second aspect of the invention, there is provided a computer cooperating with a pointing device, the pointing device being a pointing device in accordance with the first aspect of the invention.

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More specifically, the computer in this aspect comprises a pointing device, which pointing device comprises memory means capable of storing data; and further comprises data transmission means for transmitting data or control signals to or from the memory means.

35

Conveniently, where the said data comprises an access code that allows the user to enter the computer to a predetermined level of confidentiality and the transmission means is operable to transmit the access code to the computer, then the computer

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comprises electronic recognition means for recognising the access code and allowing access appropriate to the access code recognised.

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The computer may be operable to download data to the memory means via the transmission means.

Further, the computer may comprise an internal memory store and be operable to erase

10   data downloaded to a pointing device from the said internal memory store.

Advantageously, where the data stored in the memory means of the pointing device comprises a label such as a code or other data unique to that particular pointing device, then the computer may be adapted to write an identifier corresponding to that label, or

15   data derived from that label, onto any software accessible to the computer that is capable of being written to and does not comprise any data recognisable to the computer as an identifier; and the computer may then be further adapted to check whether any identifier on the software program and the label of the pointing device corresponded to one another and only allow the software to be accessed or run at a full level of

20   functionality if the label and identifier do correspond correctly. Conveniently, if no correct label match is found, then the software can still be run but only at a reduced level of functionality. For example, the user may be able to see the operation of the major program features but be unable to execute certain essential steps such as saving his input or printing it.

25

Also, the computer may be arranged to check that the label and identifier correspond correctly at intervals, either predetermined or random, during the actual use of the software.

30   In still further aspects of the invention, there is provided a process of manufacturing, programming or formatting a programmable memory device, which device comprises a software program, with the facility for the program be tagged with a first indentifying signal, which signal is derived from a code stored on a pointing device of a computer that the memory device is initially used in, and further providing that the device is

35   adapted so that when the program of the device is subsequently run, the identifying signal of the program and the code of the then attached pointing device is obtained by the computer at least once and that the program is utilisable only if the identifying signal corresponds to the code stored in the then attached pointing device. A programmable

memory device manufactured by such a process is within the ambit of the present invention, as is a programmable memory device manufactured to co-operate with the

5 computer within the scope of the second aspect of the invention as outlined above. Conveniently, a programmable memory device is a floppy disc magnetic storage medium.

The term 'stylus', for the avoidance of doubt, may be considered as covering those pen

10 like pointing or drawing devices that are used to co-operate with a digitising pad. Such pads may be pressure sensitive, in which event the pointing device would be essentially empty or solid apart from the integers referenced above. Conversely, the pad may for example comprise current sensing loops that can have a current induced in them by electro-magnetic coupling to an A.C. energised coil in the pointing device. In such an

15 embodiment, the pointing device would therefore have an A.C. coil and associated power wires as well as those integers more specifically referenced as defining the invention. It is also possible for the stylus to act as the pick up and for the pad to be the magnetic filed source.

20

Brief Description of the Drawings

The invention will now be described with reference to the accompanying drawings in which :

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Figure 1 is a schematic cross section through a pointing device for a computer in accordance with the first aspect of the invention;

Figure 2 is a schematic representation of a computer, cooperating with a

30 pointing device, in accordance with the present invention

Detailed Description

35 Referring now to Figure 1, there is shown a pointing device, indicated generally at 1, for a keyboardless computer 21, shown at reduced scale. Keyboardless computers are available from a number of sources, including Eden Group Ltd, England. Since they are known in the art, they will not be described in detail here. The pointing device is a

stylus, shaped as a hollow cylinder, with a tapering cone 2 at one end. The cone 2 terminates in a nylon tip 3. The tip 3 is the part of the pointing device that contacts the

5   surface of the computer 21 to be 'written onto', which in the present embodiment , is the glass of the display panel 30 of the computer 21. Within the body of the pointing device 1 is provided a winding 4 that forms an A.C. energisable coil. A power link 5 provides power for the coil 4 and itself draws power, via cable connection 10, from the computer 21.

10

Pointing device 1 also contains a small circuit board (not shown) on which are located a memory chip 6 which may be either EPROM or DRAM. Memory 6 is connected via bi-directional data path 7 to a data interface 8. Cable connection 10 provides a data link between data interface 8 and the computer 21.

15

Referring now to Figure 2, a display 30, preferably comprising a LCD type display, is shown forming part of a keyboardless computer as indicated at 21 in Figure 1. The input arrangement for the computer 21 comprises an electromagnetic induction digitising mat or tablet 20 underlying the display 30, together with the electromagnetic

20   pointing device 1 as described with reference to Figure 1. The digitising mat 20 comprises an electrically conducting grid with conductors running parallel to an X-axis, overlaying a similar grid with conductors running parallel to a Y-axis. As described above, the pointing device 1 comprises an energisable coil 4 which can be excited with alternating current . The amplitude of the voltages induced in the conductive grids

25   provide an indication of the position of the pointing device 1 relative to the Cartesian co-ordinate system defined by the X and Y axes. The detailed operation of this form of digitiser is well known in this field. Further reference may be made, for example, to US 4570033. Using this digitising system, the user can easily and naturally input graphical information for storage and virtually simultaneous display on the display 30.

30

It will be appreciated that a variety of components, e.g. a power supply, is necessary for the functioning of the apparatus and will have to be present in the apparatus but these are not expressly detailed here in the interests of brevity and clarity.

35   The digitising pad 20 is shown schematically underlying the LCD type display 30, although it may in practice be embedded within it. The pointing device 1 is touching the LCD 30 and electrical signals indicative of the position (X Y Co-ordinates) at which it contacts the LCD 30 are supplied to an A to D converter 11 feeding a data path or

system bus 15. A CPU 12 is connected for bi-directional data flow to the bus 15, as is
a RAM 17. A ROM 18 is also connected to bus 15, being programmed with the

5   operating system for the apparatus, including the telecommunications procedures and
the word processing and graphics software which allows users to input, amend and edit
textual or graphic information on screen using the pointing device.

CPU 12 provides all control signals via bus 15. CPU 12 may be a microprocessor such

10   as the 80286 manufactured by Intel Corporation.
A display driver 14 is connected to bus 15 and drives the display 30. In addition there
is provided a data interface 19 connected to bus 15 for sending and
receiving data information. Data interface 19 may incorporate a modem should the
network with which it is designed to be used require it.

15
Pointing device 1 is connected via cable connection 10, which includes a bi-directional
data path, to data interface 19. CPU 12 is thus able to interrogate the memory 6 in the
pointing device 1, via the data interface 8 and data path 7, for any data stored therein
and that data can be transmitted back down to CPU 12 in response, via the data

20   interface 8 and data path 7. Data path 7 and data interface 8 can be thought of as a
transmission means which enables data transfer to occur.

Typically; this process of interrogation would allow the CPU 12 to verify that the
pointing device 1 had a recognised access code and accord appropriate access to the

25   user.
There are, however, a multitude of different uses which can be made of the capability
of a pointing device embodying the present invention to store and communicate data
with a computer. For example, where the user is concerned that an unauthorised person
may gain access to his system if s/he should accidently lose his stylus or leave it

30   connected to the computer when absent from it, then the pointing device can be
programmed to generate a display of original user defined answers and questions to
which the immediate user must select the correct answer in order to access the system.
A further alternative is for the pointing device to contain a description of the true user's
signature. When the user seeks access to the system, s/he is required to perform his

35   signature so that signature verification can take place to allow access to the system
associated with that signature The approach to programming the device in these ways
is within the compass of those skilled in the art and will not therefore be elaborated
here.

By way of a further example, data from RAM 17, which may be an EEPROM or
magnetic bubble memory, may be downloaded to memory 6 in the pointing device

5   under the control of CPU 12, and the information downloaded may then be erased from
RAM 17, thus providing the pointing device 1 as the sole store of that data. Further, if
memory 6 is user programmable by, for instance, inputting specified data to the
computer 21 which specified data can then be transferred to the memory 6, then the
user may personalise the pointing device by storing personal information on it. This

1 0   possibility is a major advantage since it may greatly lessen the chance of the user
casually losing the pointing device.

For the apparatus to operate as one which inhibits the copying of software, memory 6
in the pointing device 1 will be non-erasably programmed with a label, generally a

1 5   factory code that uniquely identifies that particular pointing device. Memory 6 may for
example be the Dallas Semiconductor component serial DS 2400. The code may not be
a fixed code but instead one that merely satisfies a predetermined algorithm. For
instance, the first 5 digits of the code could be random but the subsequent 5 depend on
those first five according to a pre-programmed algorithm. In such an embodiment, then

20   in addition to the memory means 6 there would also be provided in the pointing device
1 a maths processor (not shown) capable of performing the required algorithmic
computations.

When the user acquires a new piece of software on a distribution disk that software will

25   not yet be uniquely identified in dependence on the label in the pointing device of the
user. The distribution disk, to prevent copying at this stage, may be formatted in a way
that renders it illegible to the (typically) MS-DOS utility that would otherwise read the
disk. There are a number of ways to achieve this, for example by formatting the disc
with one or more tracks wholly or partially missing.

30

When the user installs a newly acquired item of software, for instance by loading
floppy disc 22 into the floppy disc drive 23, s/he causes a pre-existing utility, capable
of reading the discs, to operate. The install utility first searches for a labelled pointing
device and for an identifier code on the new software program.

35   The install utility may be disabled if it detects that the new software program has an
identifier code, but one that differs from that associated with the attached labelled
pointing device. Further, if it detects that no labelled pointing device is attached, then it

may either not install the program onto the system or only partially install it, allowing the user to operate the program at only a reduced level of functionality.

5   If, however, it detects that a labelled pointing device is present and that the software program has no identifier code, it proceeds to alter the program on the distribution disc with an identifier code and then install the program onto the system.

A program is altered with an identifier code when it is first accessed or run on a
10   computer in accordance with this embodiment of the invention, assuming it has not been altered previously. Hence, if the program is an authorised unused program, then the install utility firstly recognises the absence of any identifier on the program and then proceeds to alter the software.
The identifier code can either be a serial code which is written into a number of
15   predetermined locations of the program. It may either be identical to or derived from the label that identifies the pointing device. Generally, it will be derived from it using an algorithm that is not publicly disclosed. Further, or alternatively, the identifier code can be that encryption code that is required to unscramble certain parts of the program.

20   Once the distribution disc is altered in this way, the install utility installs the program into the system.

If a user has X number of machines on which s/he wants to run a given piece of software, then each machine can be arranged to incorporate a pointing device with the
25   same label. Alternatively, if each machine has a pointing device with a different label, then it can be arranged for each serial identifier code to be written onto the software, the distribution disc being factory formatted to allow X different serial identifier codes to be incorporated.

30   When the program, now marked with the identifier, is used again, the install utility recognises the presence of the identifying alterations and the presence of a labelled pointing device 1 and then proceeds to compare it with a record of the label of the pointing device 1. If the label and the identifier correspond, i.e. if the software program was first run on a machine using the pointing device that is now being used, then the
35   install utility will allow the program to continue. The install utility can be arranged to perform this verification process not only whenever a piece of software is accessed but during subsequent operation too.

Claims

1.   Pointing device for a computer comprising memory means capable of storing data; and data transmission means for transmitting data or control signals between the memory means and the computer.

2.   Pointing device for a computer as claimed in Claim 1 wherein the data comprises an access code that allows the user to enter the computer to a predetermined level of confidentiality; the transmission means is operable to transmit the access code to the computer; and the computer comprises electronic recognition means for recognising the access code and allowing access appropriate to the access code recognised.

3.   Pointing device for a computer as claimed in either Claim 1 or Claim 2 wherein the computer is operable to download data to the memory means via the transmission means.

4.   Pointing device for a computer as claimed in Claim 3 wherein the computer comprises an internal memory store and is operable to erase data downloaded to a pointing device from the said internal memory store.

5.   Pointing device for a computer as claimed in Claim 1 wherein the data stored in the memory means comprises information that can be displayed on a display of the computer, the displayed information comprising a menu of false and true statements, whereby the user must select the true statement or statements displayed in order to access further data.

6.   Pointing device for a computer as claimed in any preceding Claim wherein the memory means comprises a non-erasable memory store.

7.   Pointing device for a computer as claimed in any preceding Claim wherein:
          the data stored in the memory means comprises a label such as a code or other data associated with that particular pointing device;
          the computer is adapted to write an identifier corresponding to that label, or data derived from that label, or alter in a manner determined by that label, any

software accessible to the computer that is capable of being written to and does not comprise any data recognisable to the computer as an identifier;

5   the computer being further adapted to check whether any identifier on the software program and the label of the pointing device corresponded to one another and only allow the software to be installed and/ or run at a full level of functionality if the label and identifier do correspond correctly.

10   8.   Pointing device for a computer as claimed in Claim 7 wherein the label is computed by a stored algorithm by a processing means.

9.   Pointing device for a computer as claimed in Claims 7 or 8 wherein the computer is arranged to check that the label and identifier correspond correctly at
15   intervals, either predetermined or random, during the actual use of the software.

10.   Pointing device for a computer as claimed in any preceding claim wherein the pointing device is a mouse.

20   11.   Pointing device for a computer as claimed in any preceding claims 1-9 wherein the pointing device is a stylus.

12.   Computer cooperating with a pointing device, the pointing device being a pointing device in accordance with any of the preceding claims.
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13.   Computer cooperating with a pointing device, which pointing device comprises memory means capable of storing data; and further comprises data transmission means for transmitting data or control signals to or from the memory means.

30   14.   Computer cooperating with a pointing device as claimed in Claim 13 wherein, where the said data comprises an access code that allows the user to enter the computer to a predetermined level of confidentiality and the transmission means is operable to transmit the access code to the computer, then the computer comprises electronic recognition means for recognising the access code and allowing access appropriate to
35   the access code recognised.

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15.   Computer cooperating with a pointing device as claimed in either of Claims 12, 13 or 14 wherein the computer is operable to download data to the memory means via the transmission means.

16.   Computer cooperating with a pointing device as claimed in any of claims 12-15 wherein the computer comprises an internal memory store and is operable to erase data downloaded to a pointing device from the said internal memory store.

17.   Computer cooperating with a pointing device as claimed in any of claims 12-16, wherein if the data stored in the memory means of the pointing device comprises a label such as a code or other data unique to that particular pointing device, then the computer is adapted to write an identifier corresponding to that label, or data derived from that label, or alter in a manner determined by that label, any software accessible to the computer that is capable of being written to and does not comprise any data recognisable to the computer as an identifier; and the computer is then further adapted to check whether any identifier on the software program and the label of the pointing device corresponded to one another.and only to allow the software to be installed and/ or run at the full level of functionality if the label and identifier do correspond correctly.

18.   Computer cooperating with a pointing device, as claimed in any of claims 11-16 wherein the computer is arranged to check that the label and identifier correspond correctly at intervals, either predetermined or random, during the actual use of the software.

19.   Computer cooperating with a pointing device, as claimed in any of claims 11-18 wherein the pointing device is a mouse.

20.   Computer cooperating with a pointing device, as claimed in any of claims 11-18 wherein the pointing device is a stylus.

21.   Computer cooperating with a pointing device, as claimed in any of claims 17-20, further arranged such that if the identifier and the label do not correspond,or the computer is unable to locate an attached pointing device from which to obtain a label, then the software is installable and/or runable at a reduced level of functionality.

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22. Method of inhibiting the pirating of a software program comprising the steps of:
providing the software program with the facility to be tagged with a first
indentifying signal, which signal is derived from a code stored on a pointing device of a
computer that the program is initially run on, and further providing that when the
program is subsequently run, the identifying signal of the program and the code of the
then attached pointing device is obtained by the computer at least once and that the
program is utilisable only if the identifying signal corresponds to the code stored in the
then attached pointing device.

23. The process of manufacturing, programming or formatting a programmable
memory device, which device comprises a software program, with the facility for the
program be tagged with a first indentifying signal, which signal is derived from a code
stored on a pointing device of a computer that the memory device is initially used in,
and further providing that the device is adapted so that when the program of the device
is subsequently run, the identifying signal of the program and the code of the then
attached pointing device is obtainable by the computer at least once and that the program
is utilisable only if the identifying signal corresponds to the code stored in the then
attached pointing device.

24. A programmable memory device manufactured by the process of Claim 23.

25. The programmable memory device of Claim 23 or Claim 24, wherein the device
is a magnetic disc.

26. A programmable memory device manufactured to co-operate with the pointing
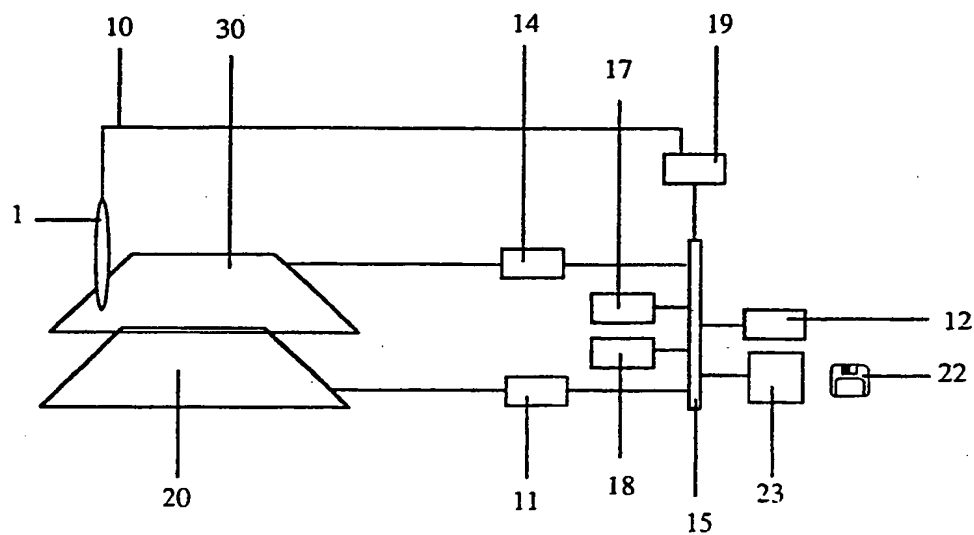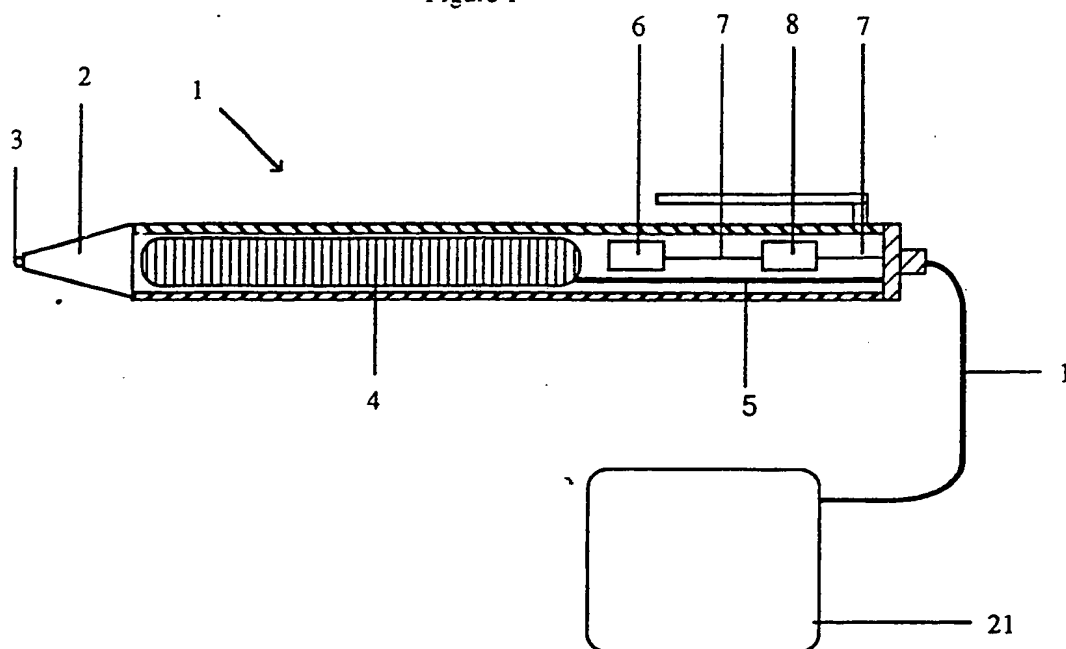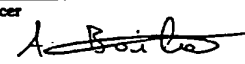device of Claim 7 or the computer of Claim 17.

1/1

Figure 1

Figure 2

I. CLASSIFICATION OF SUBJECT MATTER   (if several classification symbols apply, indicate all)[6]

According to International Patent Classification (IPC) or to both National Classification and IPC

Int.Cl. 5 G06F1/00;   G06F3/033;   G06K11/18

II. FIELDS SEARCHED

Minimum Documentation Searched[7]

Classification System	Classification Symbols
Int.Cl. 5	G06F ; G06K

Documentation Searched other than Minimum Documentation
to the Extent that such Documents are Included in the Fields Searched[8]

III. DOCUMENTS CONSIDERED TO BE RELEVANT[9]		
Category[o]	Citation of Document,[11] with indication, where appropriate, of the relevant passages[12]	Relevant to Claim No.[13]
X	EP,A,0 365 918 (INTERNATIONAL BUSINESS MACHINES) 2 May 1990 see the whole document	1,2, 11-14
Y		3-9, 15-18, 20-26
Y	US,A,4 688 169 (JOSHI B. S.) 18 August 1987 see the whole document	7-9,17, 18,20-26
Y	HEALTH SERVICE JOURNAL vol. 100, no. 5188, 15 February 1990, UNITED KINGDOM pages 255 - 256; PERCIVAL M. ET AL: 'Data in the districts' see page 255, left column, line 1 - page 256, left column, line 14	3,4,6, 15,16
A		17
	-/--	

° Special categories of cited documents :[10]

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

IV. CERTIFICATION	
Date of the Actual Completion of the International Search

04 AUGUST 1992 | Date of Mailing of this International Search Report

17. 08. 92 |
| International Searching Authority

EUROPEAN PATENT OFFICE | Signature of Authorized Officer

BAILAS A. |

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category°	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
Y	ANGEWANDTE INFORMATIK: APPLIED INFORMATICS vol. 31, no. 1, 1989, WIESBADEN, DE pages 3 - 13; PILLER E.: 'Passwörter und ihre Erzeugung' see page 9, left column, line 15 - line 56 ---	5
A	US,A,4 658 093 (HELLMAN M. E.) 14 April 1987 see column 2, line 30 - line 48 ---	21

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information. 04/08/92

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
EP-A-0365918	02-05-90	US-A-	5007085	09-04-91
		JP-A-	2158820	19-06-90
US-A-4688169	18-08-87	None		
US-A-4658093	14-04-87	None		

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82